# Weight Loss Outcomes Among Older and Younger Adults in an Adapted Diabetes Prevention Program

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## Abstract

**Purpose**

To evaluate if there are differences in self-monitoring fat, physical activity, and achievement of the 7% weight loss goal between older and younger adults enrolled in an adapted, group-based diabetes prevention program (DPP).

**Methods**

From 2008 to 2011, adults (N = 1,810) at high-risk for cardiovascular disease (CVD) and type 2 diabetes were enrolled in a DPP. Multiple logistic regression (LR) analyses were used to identify factors associated with self-monitoring of fat intake, achievement of the physical activity goal, and achievement of the 7% weight loss goal.

**Results**

- 25% of participants (n = 455) were 18 to 44 years of age
- 60% (n = 1,097) were 45 to 64 years of age
- 14% (n = 258) were 65 years of age and older

In bivariate analyses, participants aged ≥65 years were significantly more likely to achieve the weight loss goal (44%) vs. participants aged 45-64 years (40%) and participants aged 18-44 years (28%).

Using multiple LR analyses adjusting for age, sex, baseline BMI, achievement of the physical activity goal, and number of weeks self-monitoring fat intake, older participants were significantly more likely to self-monitor their fat intake and to achieve the physical activity goal compared to younger participants. However, age was not independently associated with achievement of the weight loss goal.

**Conclusion**

Younger participants in a DPP can achieve weight loss-related behaviors and the 7% weight loss goal as well as older participants.

## Background

- The prevalence of type 2 diabetes continues to rise in the US. It is estimated that 1 in 3 individuals born in 2000 will develop type 2 diabetes in their lifetime.[1]
- The National Institutes of Health (NIH) and Finnish DPP studies demonstrated that the incidence of type 2 diabetes among adults at high-risk can be significantly reduced through intensive lifestyle intervention.[2,3]
- The Montana Department of Public Health and Human Services (DPHHS) began implementing an adapted, group-based DPP in 2008 and achieved results very similar those achieved by the NIH DPP.[4,5]

## Objective

**To evaluate the effect of age on achievement of lifestyle change goals for self-monitoring dietary fat intake, increased physical activity, and 7% weight loss among participants in the Montana DPHHS adapted, group-based DPP.**

## Methods

**Intervention Sites and Intervention Design**

**Sites:** The Montana DPHHS began implementing the DPP at 4 health care facilities in 2008 and expanded to 14 sites in 2011.
- 12 hospital outpatient DSME programs, 2 collaborated with the Y
- 1 rural health clinic
- 1 local health department

**Lifestyle Coaches:** Trained health professionals (RN, RD, CDE, PT).

**Intervention:** 10-month intensive lifestyle intervention: 16 weekly core sessions followed by 6 monthly after core sessions.

**Curriculum:** NIH DPP *Lifestyle Balance* curriculum. Sessions include healthy eating, physical activity, and problem solving.[6]

**Participant Lifestyle Change Goals:**
- Self-monitoring dietary intake and physical activity
- ↓ fat gram intake
- ↑ moderately intense physical activity to ≥150 min/week
- 7% weight loss

**Recruitment Strategies:** Referring providers, community groups, and employers; paid and earned media, brochures, and word-of-mouth.

**Participant Eligibility Criteria**

1. Aged 18 years and older
2. Overweight (BMI ≥ 25.0 kg/m$^2$)
3. Plus ≥1 of the following risk factors for CVD and type 2 diabetes:
   a) Diagnosis of prediabetes, IGT or IFG
   b) A1C between 5.7% and 6.4% (added in 2011)
   c) High blood pressure (≥130/85 mmHg or treatment)
   d) Dyslipidemia
      - triglycerides >150 mg/d:
      - LDL-cholesterol >130mg/dl or treatment
      - HDL-cholesterol <40mg/dl for men or <50mg/dl for women
   e) History of GDM or gave birth to a baby >9 lbs

*Exclusion criteria: diagnosed with diabetes, unstable cardiac disease, cancer and currently undergoing treatment, or end-stage renal disease or currently on dialysis; were unable to participate in regular, moderate physical activity; or were pregnant or planning to become pregnant within the next six months.*

**Data Collection**

At baseline, 4 months and 10 months: height, weight, BMI, and labs..

At each session, weight measured and self-monitoring records for dietary fat intake (avg grams/day) and physical activity (min/week).

**Data Analysis**

Data were analyzed using SPSS v.15.0 (Chicago, IL).

Bivariate analyses were used to compare weight loss outcomes among participants in the three age groups.

Multiple LR analyses adjusting for age, sex, baseline BMI, number of weeks of self-monitoring fat intake, and achievement of the physical activity goal were used to identify variables independently associated with participant achievement of the lifestyle change goals. Adjusted odds ratios (ORs) and 95% confidence intervals (CI) were calculated.

## Results

**Results Summary**

In bivariate analyses, older participants were significantly more likely to achieve the weight loss goal than younger participants (Table 1).

**Table 1. Age distribution and achievement of the 7% weight loss goal among participants in the Montana Cardiovascular Disease and Diabetes Prevention Program, 2008 – 2011 (N = 1,810).**

| Age (years) | Distribution % (n) | Achievement of 7% weight loss goal % |
|---|---|---|
| ≥65 | 14 (258) | 44* |
| 44-64 | 60 (1,097) | 40 |
| 18-44 | 25 (455) | 28 |

*P<0.05

In multiple LR analyses, older participants were significantly more likely to self-monitor fat intake and to achieve the physical activity goal than younger participants. However, age was not independently associated with achievement of the weight loss goal (Table 2).

**Table 2. Factors independently associated with self-monitoring fat intake, achieving the physical activity goal of ≥150 minutes per week, and achieving the 7% weight loss goal among participants in the Montana Cardiovascular Disease and Diabetes Prevention Program, 2008 – 2011 (N = 1,810).**

| | Self-monitored fat intake ≥14 weeks | | Achieved ≥150 min/week physical activity goal | | Achieved 7% weight loss goal | |
|---|---|---|---|---|---|---|
| | AOR (95% CI)[a] | P | AOR (95% CI) | P | AOR (95% CI) | P |
| **Age (years)** | | | | | | |
| ≥65 | **2.18 (1.43 – 4.75)** | **≤0.001** | **1.69 (1.19 – 2.40)** | **0.003** | 1.02 (0.81 – 1.47) | 0.93 |
| 45-64 | 1.34 (0.95 – 1.89) | 0.10 | **1.32 (1.11 – 1.68)** | **0.03** | 1.22 (0.93 – 1.61) | 0.16 |
| 18-44^ | -- | | -- | | -- | |
| **Sex** | | | | | | |
| Male | **1.42 (1.04 – 1.93)** | **0.03** | **1.41 (1.08 – 1.84)** | **0.01** | **1.39 (1.05 – 1.84)** | **0.02** |
| Female^ | -- | | -- | | -- | |
| **BMI (kg/m$^2$) at baseline** | | | | | | |
| ≥35.0 | 0.78 (0.55 – 1.09) | 0.15 | **0.66 (0.50 – 0.87)** | **0.003** | 0.90 (0.67 – 1.20) | 0.47 |
| 30.0-34.9 | 0.98 (0.69 – 1.38) | 0.89 | 0.97 (0.72 – 1.30) | 0.82 | 0.95 (0.70 – 1.30) | 0.76 |
| 25.0-29.9^ | -- | | -- | | -- | |
| **Self-monitored fat (weeks)** | | | | | | |
| ≥14 | -- | | **7.03 (5.10 – 9.72)** | **≤0.001** | **14.52 (9.91 – 21.30)** | **≤0.001** |
| 7-13 | -- | | **3.54 (2.84 – 4.42)** | **≤0.001** | **6.12 (4.46 – 8.41)** | **0.01** |
| 0-6^ | -- | | -- | | -- | |
| **Physical activity goal** | | | | | | |
| Met | **2.58 (1.91 – 3.49)** | **≤0.001** | -- | | **1.56 (1.23 – 1.97)** | **≤0.001** |
| Unmet/ Unknown^ | -- | | -- | | -- | |

*Adjusted odds ratio (ninety-five percent confidence interval); ^Referent

## Discussion

**Conclusions**

Both younger and older participants in an adapted DPP can achieve similar weight loss-related behaviors and the 7% weight loss goal. This suggests that the intensive lifestyle intervention has similar effectiveness for short-term weight loss across the adult lifespan.

Our findings also reinforced the importance of lifestyle change behaviors (i.e., self-monitoring of fat intake and increased levels of moderately intense physical activity) to achieve weight loss outcomes.[7]

**Study Limitations**

- Self-monitored dietary fat and physical activity data were used, which introduces self-report bias and recall bias.
- The study did not adjust for additional demographic characteristics (e.g., household income) or psychosocial characteristics (e.g., depression). However, the NIH DPP found that these variables were not independently associated with weight loss outcomes.[8]
- The study did not assess incidence of type 2 diabetes, calculate reduction in risk, or long-term weight loss maintenance.

**Discussion**

Older adults may be more successful in adopting the lifestyle behavior changes, such as self-monitoring dietary intake, engaging in increased physical activity, and attending classes.[9]

Although our study showed similar outcomes among age groups for short-term weight loss and achievement of the 7% weight loss goal over the 16-week core, the DPP clinical trials found differences in long-term weight loss maintenance and risk reduction.

- The DPP Outcomes Study showed that participants aged ≥45 years at the time of randomization had greater sustained weight loss in the 10-year follow-up than participants aged <45 years.[9]
- Greater reduction in incidence of type 2 diabetes was associated with older age among participants in the lifestyle intervention; participants aged ≥60 years showed a 71% reduced risk during the NIH DPP and a 49% reduction at the 10-year follow-up.[3,9]

Further study is needed on the factors that facilitate older participants in adopting weight-loss related behavior changes and having more successful long-term weight loss maintenance and risk reduction.

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## Montana Cardiovascular Disease & Diabetes Prevention Program

This program was supported by the State of Montana and Cooperative Agreement Numbers 3U58DP001977 from the Centers for Disease Control and Prevention.
Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention.

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